Feasibility of a group cessation program for co-smokers of cannabis and tobacco

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Abstract: Introduction and Aims: This study aims to evaluate the feasibility and effects of a group cessation program for cannabis and tobacco co-smokers. Design and Methods: Using a repeated-measures design with pre-, post- and six months follow-up assessments, feasibility (intervention utilisation, safety and acceptability) and changes in substance use behaviour and mental health were evaluated. The intervention consisted of five to six group sessions and was based on current treatment techniques (e.g. motivational interviewing, cognitive-behavioural therapy, and self-control training). In total, 77 adults who used cannabis at least once weekly and cigarettes or similar products at least once daily participated in the study. Results: Within nine months, the target sample size was reached. Treatment retention was 62.3%, and only three participants discontinued treatment due to severe problems (concentration problems, sleeping problems, depressive symptoms, and/or distorted perceptions). In total, 41.5% and 23.4% reported abstinence from cigarettes, cannabis or both at the end of treatment and the follow-up, respectively. The individual abstinence rates for cigarettes and cannabis were 32.5% and 23.4% (end of treatment) and 10.4% and 19.5% (follow-up), and 13% (end of treatment) and 5.2% (follow-up) achieved dual abstinence validated for tobacco abstinence. Over the study period, significant decreases in tobacco and cannabis use frequencies and significant improvements in additional outcomes (drinking problems, symptoms of cannabis use disorder, nicotine dependence, depression and anxiety) were achieved. Discussion and Conclusions: The evaluated intervention for co-smokers is feasible regarding recruitment, intervention retention and safety. The promising results regarding substance use and mental health support a randomised controlled trial to evaluate effectiveness. [Becker J, Haug S, Kraemer T, Schaub MP. Feasibility of a group cessation program for co-smokers of cannabis and tobacco. Drug Alcohol Rev 2014]

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Abstract

Background/Aims:

To evaluate the feasibility and the effects of a group cessation program for co-smokers of cannabis and tobacco.

Methods:

Using a within-participants design with pre-, post-, and 6-month follow-up assessments, feasibility and changes in substance use and mental health were evaluated. A total of 77 co-smoking adults participated in the study.

Results:

Within nine months the target sample size was reached. Treatment retention was 62.3%, and only three participants discontinued the treatment due to severe problems (problems with concentration, sleeping problems, depressive symptoms, and/or distorted perceptions). 41.5% and 23.4% reported abstinence from cigarettes, cannabis, or both at the end-of-treatment and the follow-up, respectively. The separate abstinence rates for cigarettes and cannabis were 32.5% and 23.4% (end-of-treatment) and 10.4% and 19.5% (follow-up). 13.0% (end-of-treatment) and 5.2% (follow-up) achieved cotinine-validated dual-abstinence. Over the study period, significant decreases of tobacco-use and cannabis-use and significant improvements in further outcomes (problem drinking, cannabis use disorder symptoms, nicotine dependence, depression, anxiety) were achieved.

Conclusion:

The evaluated intervention for co-smokers is feasible regarding recruitment, intervention retention, and intervention safety. The promising results regarding substance use behaviour and mental health suggest an evaluation of effectiveness in a randomized controlled trial.

Introduction

Cannabis use is associated with a range of problems including those related to mental and physical health, cognition, and educational outcomes [1,2]. Tobacco smoking is among the three leading risk factors for the global disease burden [3]. Both substances are often used concurrently. Tobacco smokers are more likely to use cannabis compared with non-smokers [4] and vice versa [5]. The mechanisms linking these two substances most likely extend beyond a shared vulnerability and the co-use of substances in general [6]. Among these connecting mechanisms are the shared route of administration (i.e. both substances are typically smoked) and co-administration (e.g. tobacco is added to cannabis joints in a process known as "mulling") [7]. In Australia, mulling is a widespread way of delivering cannabis [8–10] and in Switzerland 90% of cannabis users smoke joints mixed with tobacco [11].

This strong relationship between tobacco and cannabis use is also relevant in the context of cessation. Epidemiological evidence shows that co-smokers make fewer attempts at quitting tobacco use compared with tobacco-only smokers [12] and are less successful at quitting [13]. Compared with tobacco-only smokers, co-smokers have poorer outcomes when participating in tobacco-cessation interventions [14]. Correspondingly, cannabis-dependence treatments are less effective among individuals who also smoke tobacco [15,16]. Moreover, a laboratory study of non-treatment-seeking marijuana users revealed that co-smokers of cigarettes were more likely to relapse after a phase of cannabis abstinence compared with non-cigarette smokers [17]. Smoking cigarettes is assumed to provide behavioural and physiological cues for cannabis smoking and vice versa, which may explain the increased probability of relapsing among co-smokers [7,15]. In line with this hypothesis, a study analysed adolescents in substance-abuse treatment and found that never-smokers and those non-smokers who quit using tobacco during their marijuana treatment had a lower risk of marijuana relapse than those who continued or initiated tobacco smoking during treatment [16].

Despite the strong relationship between these substances, interventions typically target only one substance while addressing the other marginally or not at all. The historical development of the treatment and prevention systems in many industrialised countries might explain the lack of combined interventions. While cannabis dependence is usually treated in the psychiatric care system, interventions for tobacco users are part of the general public health system [18,19]. Recently, several reviews and a demand analysis identified a need for interventions tailored to co-smokers of tobacco and cannabis [7,20–22]. To date, one small pilot study evaluated individual cognitive behavioural therapy combined with nicotine replacement therapy (NRT) for co-occurring cannabis and nicotine dependence [23]. The seven participants who completed the intervention reduced their tobacco use while maintaining their cannabis use level. Similarly, tobacco smoking cessation interventions integrated in treatments of alcohol or opioid dependence have achieved positive results [24–26], which indicates that tobacco cessation interventions do not undermine other substance abuse treatments. Instead, dual treatment programs generate putatively better outcomes with regard to one or both targeted behaviours [18,27,28].

The current study aimed to test the feasibility and effects of a group cessation intervention for co-smokers targeting cannabis and tobacco use simultaneously. This study is the first to evaluate these aspects with regard to the dual-cessation of cannabis and tobacco use in a group setting. Furthermore, it is a novelty to examine dual-abstinence from cannabis and tobacco.

Methods

Study design and procedure

This study used a within-participant design with pre-, post-, and 6-month follow-up assessments to evaluate the feasibility of an integrative group cessation intervention that targeted co-smokers of cannabis and tobacco. Two addiction treatment centres in Zurich and

Winterthur, Switzerland, offered the courses between January and October 2012. The Ethics Committee of the Canton of Zurich reviewed and approved this study (KEK-StV-Nr.23/11), which was designed in accordance with the Helsinki declaration. All participants provided written informed consent. The study is registered at Current Controlled Trials (ISRCTN15248397).

Baseline data were collected via questionnaires administered during an information evening or via the post for participants who did not attend the information evening.

The end-of-treatment (EOT) assessment was conducted during the last session of the course. Participants completed a questionnaire and provided a saliva sample. To maximise response rates, we attempted to collect data from individuals who had discontinued treatment. Therefore, these individuals received the questionnaire and the salivette for the saliva sample via the post. Participants who did not return the questionnaire were contacted via telephone or e-mail and motivated to complete the questionnaire. If contact was not established or the participants reported that they did not receive or lost the questionnaire, then we resent the questionnaire. When the reminders were unsuccessful, participants received a brief version of the questionnaire that only assessed the primary outcomes.

The follow-up measurement was conducted six months after the designated quit date. All participants received a questionnaire and a salivette via the post. The measurement procedure was comparable with the EOT assessment, the only difference being that we resent the questionnaire up to three times before using brief online or phone questionnaires. Participants who did not complete the intervention were additionally contacted by phone or e-mail to assess their reasons for discontinuation. Moreover, 500 Swiss Francs were raffled to one of the participants who returned their completed questionnaire and saliva sample.

For recruitment, a press release announcing the intervention and the accompanying study was issued via local newspapers, television, and the radio to recruit participants. In addition, counselling centres for addiction prevention and treatment, psychiatrists, and health

care centres received leaflets and brochures and were ask to distribute them. Two social media platforms and an advertisement in the online edition of a popular free newspaper were used to recruit online. All recruitment methods referred potential participants to the intervention's website for more information. Finally, an information evening was offered. The publication regarding the development of the intervention provides a detailed description of the recruitment process [22].

Participants

The inclusion criteria for study participation were (1) an age of 18 years and older; (2) cannabis smoking at least once per week; and (3) daily tobacco cigarette, pipe, or cigar smoking. The exclusion criteria included (1) a current, serious psychiatric illness or a history of psychosis, schizophrenia, or bipolar type I disorder; (2) other smoking cessation treatment at study entry; and (3) an inability to read or write in German.

Figure 1 provides an overview of the participant flow through the study. A total of 104 people were screened for eligibility. Of these, 12 declined to participate, six provided informed consent but never appeared at a course session, and three were excluded from participation because they no longer smoked both substances. Of the 83 participants who began the intervention, four participants were admitted to attend the courses but not included in the study because they smoked cannabis less than once per week (n = 2) or were in treatment for psychosis (n = 2). Two participants were retrospectively excluded from the study: One participant admitted during the study that she had already quit using cannabis prior to the baseline assessment; the other participant did not return the informed consent form. Thus, 77 (74.0%) of the screened participants were included in the study.

Intervention

The intervention was structured into five to six weekly 2-hour group therapy sessions and guided by two course instructors. Additionally, the course instructors offered each participant one individual counselling session on request and recommended NRT and varenicline. At least one of the course instructors had to be a psychiatrist to guarantee the offer of prescription pharmacotherapy to reduce acute withdrawal symptoms or eventual exacerbations of severe psychiatric symptoms. During the first implementation phase, three 5-session courses were conducted with 13, 16, and 11 participants. Based on the course instructors' feedback provided after the first implementation phase, the course content was redistributed over six sessions. In the second implementation phase, four 6-session courses were conducted with 6, 8, 13, and 10 participants. All participants were expected to refrain from tobacco and cannabis use after the third session (the "quit day").

The instructors received a therapist manual containing instructions for guiding the sessions. To the participants they distributed a smoking diary and a workbook, containing background information, an overview of the course structure and content, and work sheets to reflect on personal reasons for cessation and develop and write down personal strategies. The treatment included therapeutic elements derived from motivational interviewing [29], cognitive behavioural therapy, the relapse prevention model [30], and self-control practices. Although most of these principles and techniques were applied throughout the duration of the course, the emphasis on the application of each principle differed. Motivational enhancement strategies predominated in the early sessions of the intervention to address participants' ambivalence about quitting and strengthen their motivation to change. In the following sessions, self-control practices were highlighted, such as the analysis of one's own smoking behaviour with the help of a smoking diary. After the Quit Day, the focus was set on relapse prevention by promoting the development of personal strategies to avoid or cope with tobacco and cannabis use triggers. During the first 30 to 60 minutes of each session, participants and course instructors discussed the smoking behaviour of the preceding week and could share

experiences and problems. Here, participants received support both from the other participants and from the instructors. Afterwards, they worked on the chapters of the manual scheduled for the session.

Participants who continued using tobacco, cannabis, or both after the Quit Day were encouraged to make an additional attempt to quit. To avoid the attrition due to participant failure, the course instructors could promote reducing use or changing to a less harmful form of administration (e.g. orally or with a vaporiser) [31] when participants failed to quit several times.

A detailed description of the intervention and its development has been published elsewhere [22].

Measures

Intervention feasibility. To determine the feasibility of the intervention, we used recruitment success, intervention retention, study attrition, intervention safety, and intervention acceptability as indicators.

We aimed to recruit around 80 participants. Although feasibility studies are often conducted with smaller sample sizes, we chose this considerably high number in order to have a sufficient sample size for subgroup analyses.

Intervention retention was defined as not missing more than one session, or missing two sessions but not the last session. The reasons for intervention dropout were assessed among the dropouts using a multiple-choice question in which more than one answer was acceptable (specified in Table 2); dropouts were also provided the opportunity to explicate additional non-listed reasons.

To evaluate intervention safety, we explicitly enquired the experience of severe problems due to course participation as reason for course dropout. Using semi-structured

interviews conducted with the course instructors after course implementation, we also assessed potential hospitalisation among intervention completers as further measure of safety.

Participant satisfaction, i.e. acceptability, was measured with the item, "Would you recommend the course to a friend in a similar situation?" with a scale ranging from 0 ("definitely no") to 5 ("definitely yes") at the EOT assessment. In addition, at the follow-up participants were asked whether they had recommended the course to anyone.

Cannabis and tobacco use. Baseline cannabis use for the previous seven days was measured according to the timeline follow-back (TLFB) method which has been shown to be a self-report measure with high agreement rates with biological measures [32]. Baseline cigarette use frequency was measured in terms of the daily amount of cigarettes smoked during a typical smoking day, corrected for the number of smoking days during the past month. At the EOT and 6-month follow-up, 7-day cigarette and cannabis use frequency were assessed using the TLFB method. Participants who reported that they did not use one substance were considered abstinent with regard to this substance. Dual-abstinence was defined as reporting neither cigarette nor cannabis use. Salivary cotinine was used to analytically verify self-reported dual-abstinence, with a cut-off value of 5-ng/ml cotinine. Participants who reported dual-abstinence but had a positive cotinine test were counted as non-abstinent. If this inconsistency could be explained via sustained NRT, then participants were counted as abstinent. Because the use of NRT was only assessed at EOT, this correction could not be applied for the follow-up assessment. Cannabis abstinence was not analytically validated because of the lack of methods of salivary delta-9-tetrahydrocannabinol (THC) verification that are valid and applicable under the sampling and transport conditions [33]. Furthermore, the course instructors were strongly opposed to collecting urine THC samples.

Problematic cannabis use was measured using the Cannabis Use Disorders Identification Test (CUDIT; [34]) which has been validated in a Swiss sample [35]. Nicotine dependence was measured using the Fagerstrom Test for Nicotine Dependence (FTND; [36]).

Alcohol use und mental health. Problematic alcohol use was measured using the Alcohol Use Disorders Identification Test - Consumption (AUDIT-C; [37]). To assess mental health the German short version of the Beck Depression Inventory (BDI-V; [38,39]) and the Beck Anxiety Inventory (BAI; [40,41]) were used. Continuous scales were used instead of cut-off values to better capture the variability across the range of symptoms for all variables. The CUDIT was administered at baseline and the 6-month follow-up; all other variables were additionally assessed at the EOT.

Baseline variables. The demographic variables gender, age, highest educational attainment, and employment status were assessed at baseline. Furthermore, regular medication and lifetime use of cocaine and ecstasy were measured. Participants were also asked to indicate whether they have been diagnosed with one or several of the following psychiatric diseases: Schizophrenia, depression, anxiety disorder, attention deficit hyperactivity disorder, and/or other psychiatric diseases. Readiness to quit tobacco and cannabis, respectively, was assessed using readiness rulers [42] with a scale ranging from 1 (“not at all”) to 10 (“very much”).

Data analyses

We analysed the differences between study dropouts and completers with regard to the baseline variables. Given the small number of dropouts, we used Mann-Whitney *U* tests and Fisher’s exact tests.

To examine abstinence, descriptive tables were created to provide an overview of the number of participants abstinent from (1) cannabis, (2) cigarettes, or (3) both according to the

self-report and the biochemical validation at the EOT and follow-up assessments. We reported abstinence rates based on complete case analyses (CCAs) and on an analysis in which all missing participants were regarded as non-abstinent (MAU).

To analyse whether cannabis use frequency, cigarette use frequency, problematic cannabis use, nicotine dependence, problematic alcohol use, and mental health changed over time, we used generalised estimating equations (GEEs). This method accounts for the correlated nature of within-participant repeated-measures data. One of the advantages of this method is that it is consistent with intent-to-treat analyses because it accounts for all participants, regardless of missing values on EOT or follow-up assessments [43]. An exchangeable working correlation matrix was applied to each model, and measurement time (i.e. baseline, EOT, and follow-up) was entered as a predictor. To model variables with distributions characterised by a high proportion of zeroes (i.e. nicotine dependence and the frequency of cigarette and cannabis use) negative binomial models with a log link function were applied. A normal model with an identity link function was chosen for the other outcomes.

We also conducted exploratory subgroup analyses to examine whether participants who failed to achieve dual-abstinence but successfully quit one substance compensated for their abstinence via the increased use of the remaining substance. Therefore, we calculated change scores for each substance by subtracting the use frequencies reported at the EOT and follow-up, respectively, from those reported at baseline. Then, we compared these change scores between abstainers of only one substance and participants who continued to co-smoke using Mann-Whitney *U* tests.

All analyses were conducted using IBM SPSS version 20.0 [44].

Results

Participant characteristics and study attrition analysis

At the EOT and follow-up assessments, 60 (77.9%) and 62 (80.5%) participants, respectively, provided at least their self-report data concerning the frequency of cannabis and cigarette use over the last week (Figure 1). Of those who indicated dual-abstinence, 10 (90.9%) and 4 (60.7%) participants provided cotinine samples at the EOT and follow-up, respectively.

Table 1 shows socio-demographic characteristics and substance use behaviour of the sample at baseline and the comparison between participants who provided self-report data regarding their use frequency at the 6-month follow-up (n = 59) and those who did not (n = 18). Significance tests did not yield between-group differences.

---Table 1---

Regarding prior quit attempts, 58 (75.3%) and 61 (79.2%) participants had already made at least one attempt to quit cannabis or/and tobacco, respectively. Only 18 (23.4%) participants had already tried to quit both substances simultaneously. With regard to psychiatric diseases, 11 (14.3%), 2 (2.6%), and 2 (2.6%) participants reported that they have been diagnosed with depression, anxiety disorder, or/and ADHD, respectively.

Treatment attendance, the reasons for treatment dropout, and acceptability

Of the 77 study participants, 48 (62.3%) completed the intervention. While 25 participants (32.5%) attended all sessions, 11 participants (15.6%) attended fewer than 50% of the sessions, and one participant (1.3%) attended only one session. Only seven participants used individual counselling; the majority of these participants spoke only briefly with the course facilitators before or after the course session or during the short break, but they did not arrange a separate counselling session.

Twenty-one (72.4%) of the 29 participants who discontinued the intervention provided reasons for course disruption (Table 2). There were no reports of any hospitalisations as a consequence of course participation.

At the EOT assessment, 57 participants responded to the question regarding whether they would recommend the intervention to someone else. The majority of these participants (33, 57.9%) chose the highest value of 5 (i.e. "definitely yes", M = 4.2, SD = 1.1). By the follow-up, 24 of 44 (54.5%) participants had already recommended the course to another person.

---Table 2---

Cannabis and tobacco use

A total of 32 participants (41.5%) reported either single or dual-abstinence at the EOT assessment. At the follow-up, 18 participants (23.4%) reported abstinence from one or both substances. Table 3 provides an overview of the number of abstinent participants based on the self-report and biochemical validation data, the response rates, and the corresponding abstinence rates for each time point. Of the 11 participants who indicated dual-abstinence at the EOT assessment, one did not provide a cotinine sample and was therefore regarded as non-abstinent. Another two participants returned positive cotinine samples but were counted as abstinent because they were using nicotine patches. At the follow-up, two of the six participants who reported dual-abstinence did not return their cotinine sample and were counted as non-abstinent.

---Table 3---

Tables 4 displays descriptive results of the frequency of cannabis and tobacco use, of problematic cannabis use and of nicotine dependence. All outcomes improved over study time. The GEE analyses revealed that these changes were significant (Table 5).

---Table 4---

---Table 5---

The results of the exploratory analyses of compensatory use after quitting only one substance are displayed in Table 6. According to the descriptive results, the use frequency did not increase among participants who continued smoking two substances or those who quit one substance; rather, participants decreased their use. We did not detect group differences with regard to the amount of reduction. However, the respective sample sizes were low and, in the case of cannabis use frequency at the follow-up assessment, a significance test was omitted.

---Table 6---

Alcohol use and mental health

Table 4 shows the descriptive results of problematic alcohol use and of depression and anxiety symptoms, all of which improved from baseline at the EOT and follow-up assessments. The GEE modelling results revealed significant time effects for all three outcomes (Table 5).

Discussion

The results of this study support the feasibility of the evaluated integrative group cessation program. First, recruitment was successful: within a recruitment period of nine months 77 co-smokers could be included in the feasibility study. Thus, the target sample size of around 80

participants was reached and recruitment could be stopped two months earlier than planned. Furthermore, 62.3% of participants completed the intervention. This retention rate is similar to the rate achieved in the pilot study that examined individual treatment of tobacco and cannabis co-smokers (58.3%) [23]. In addition, participants' high levels of satisfaction (based on their recommendation levels) illustrated acceptability. A more detailed evaluation of intervention acceptability is presented in an earlier publication [22]. We did not find evidence of hospitalisation due to course participation and only three participants indicated that severe problems due to their simultaneous cessation (attempts) were among their reasons for discontinuing the intervention. This suggests that the intervention is considerably safe. However, the finding that severe problems were experienced must be addressed when implementing the program in the future (e.g. in promoting the use of individual counselling, preparing participants for the possibility of severe problems, and motivating them to contact the course facilitators in the event they experience such problems).

Ten (13.0%) and four (5.2%) participants achieved cotinine-verified dual-abstinence from tobacco and cannabis at the EOT and the follow-up, respectively. The self-reported single-abstinence rates at the EOT and follow-up assessments were higher, i.e. for cannabis 23.4% and 19.5%, respectively, and for cigarettes 32.5% and 10.4%, respectively. The only other study of a combined intervention did not report abstinence rates [23].

Furthermore, participants reduced their use of cannabis and cigarettes and also improved regarding their problematic alcohol use and mental health during the study period, indicating the potential effectiveness of the intervention. The subgroup analyses regarding the differential changes in the use frequency between the quitters of one substance and those who continued co-smoking indicated that quitting one substance does not lead to a compensatory increase in the remaining substance when both substances are targeted in an integrative treatment, such as the present one. A substitution effect has been a major concern with regard to implementing tobacco smoking interventions within other substance abuse treatments [18].

One limitation of this study is that the study attrition limits the generalisability of the results. However, the dropout analysis revealed that participants who provided follow-up data did not differ significantly from dropouts with regard to their baseline characteristics. Further limitations concern the measurement of the outcomes related to cannabis and tobacco use. According to the aim of the present intervention, i.e. dual-cessation of cannabis and tobacco use, we aimed at quantifying simultaneous behaviour change. For this, we had to rely on a combination of validated measurement instruments for single substance use behaviour because there is no validated psychometric measurement instrument for simultaneous change so far. We therefore used dual-abstinence of both substances according to TLFB-assisted self-reports as outcome measure. To progress the evaluation interventions targeting at dual behaviour change, appropriate instruments should be constructed and validated. Another limitation is the lack of an analytical validation for cannabis abstinence. Although salivary cotinine samples are an appropriate measure to validate tobacco abstinence, a reliable method for detection of THC and/or its metabolite THC-carbonic acid and the interpretation of corresponding analytical findings, respectively, is still lacking [33]. Nevertheless, the TLFB assisted self-report is a valid measure of cannabis use frequency [32,45,46]. An additional limitation of this study is that the presence of NRT, which might explain the inconsistencies between self-reported and cotinine-validated abstinence rates, was not assessed at the 6-month follow-up assessment.

Randomised trials must be conducted to evaluate the efficacy of integrative interventions compared with single interventions among co-smokers. Moreover, future studies should implement feasible blood or urine verification methods for cannabis abstinence and evaluate alternatives to a designated quit date for all participants and both substances. For instance, staggered quit dates for tobacco and cannabis might be useful because evidence suggests that recent cigarette abstinence does not decrease the likelihood of a cannabis relapse [17]. Furthermore, a clinical comparison study found that withdrawal was more severe during

simultaneous cessation than during single cessation; however, this difference was only for a short duration, and substantial inter-individual variability was reported [47]. Finally, analysing how treatment goals other than dual-abstinence affect the treatment outcomes might be helpful in improving treatment success. For example, a tobacco-abstinence goal combined with a cannabis-use-moderation goal might be an alternative because a study that evaluated a guided self-change treatment found that most cannabis users chose to reduce their cannabis use rather than to abstain [48]. However, a cannabis abstinence goal combined with a reduced tobacco use goal is also a possibility because tobacco cessation might be a barrier to seeking treatment [49]: Cannabis users seem to be less likely to select an abstinence goal for tobacco use compared with tobacco-only smokers [50].

In summary, the present study demonstrated the feasibility of an integrative group cessation program that targeted co-smokers of cannabis and tobacco. Furthermore, promising changes in tobacco, cannabis, and alcohol use behaviour and in mental health were observed. Clinicians treating participants with cannabis use disorders should not hesitate to also integrate treatment of cigarette use and vice versa. In order to evaluate the effectiveness of the dual-intervention, we aim at conducting a randomized controlled trial in the near future.

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TABLES

Table 1. Baseline participant characteristics and the differences between study completers (followed up after 6 months; n = 59) and dropouts (n = 18).

Characteristics	Total	Completers	Dropouts	*p*
Demographic characteristics				
Age in years, mean (SD)	32.4 (8.2)	32.5 (7.8)	32.0 (9.7)	.796
Women, n (%)	19 (24.7)	16 (27.1)	3 (16.7)	.535
Education, n (%) [a]				.591
Incomplete secondary	9 (11.8)	8 (13.8)	1 (5.6)	
Secondary	43 (56.6)	31 (53.4)	12 (66.7)	
Higher	24 (31.6)	19 (32.8)	5 (27.8)	
Employed, n (%) [b]	62 (82.7)	48 (84.2)	14 (77.8)	.499
Cannabis use				
Use frequency per day, mean (SD)	3.0 (1.9)	2.9 (1.8)	3.5 (1.9)	.219
Age of onset of cannabis use, mean years (SD)	16.6 (3.3)	16.8 (3.6)	15.8 (2.0)	.436
CUDIT score, mean (SD)	18.6 (7.1)	18.7 (7.6)	18.2 (5.1)	.597
Tobacco smoking				
Cigarettes/pipes per day, mean (SD)	16.1 (9.0)	16.5 (9.6)	14.7 (6.8)	.404
Age of onset of tobacco use, mean years (SD)	15.7 (2.4)	15.7 (2.6)	15.7 (1.4)	.458
FTND score, mean (SD)	4.0 (2.0)	4.0 (2.1)	4.0 (1.7)	.950
Other substance use				
AUDIT-C score, mean (SD)	5.6 (2.3)	5.7 (2.1)	5.1 (2.9)	.145
Lifetime use of cocaine, n (%)	48 (62.3)	37 (62.7)	11 (61.1)	1.000
Lifetime use of ecstasy, n (%)	45 (58.4)	35 (59.3)	10 (55.6)	.797
Readiness to quit [c]				
Cannabis, mean (SD)	7.5 (2.2)	7.5 (2.2)	7.7 (2.3)	.521
Tobacco, mean (SD)	8.3 (1.8)	8.3 (1.8)	8.3 (1.8)	.865
Physical/mental health				
BDI-V score, mean (SD)	35.7 (19.1)	35.7 (19.3)	35.6 (18.8)	.914
BAI score, mean (SD)	12.7 (9.5)	12.5 (9.4)	13.2 (9.8)	.824
Regular use of medication, n (%)	9 (12.0)	8 (14.0)	1 (5.6)	.678

Mann-Whitney *U*-tests and Fisher's exact tests; [a] missing values: n = 1; [b] missing values: n = 2; [c] Readiness to quit was measured using contemplation ladders ranging from 1 (not at all) to 10 (very much); AUDIT-C = Alcohol Use Disorder Identification Test - Consumption, scale ranges from 0 to 12; BAI = Beck Anxiety Inventory, scale ranges from 0 to 63; BDI-V = simplified Beck Depression Inventory, scale ranges from 0 to 100; CUDIT = Cannabis Use Disorder Identification Test, scale ranges from 0 to 40; FTND = Fagerstrom Test for Nicotine Dependence, scale ranges from 0 to 10; SD = standard deviation

Table 2. Reasons for intervention disruption, assessed among non-completers (multiple answers possible, n = 21).

Reasons for intervention disruption	**N**	**% of respondents**
I had severe problems due to the cessation (attempt).	3	14.3
Problems with concentration	1	4.8
Sleeping problems	3	14.3
Depressive symptoms	2	9.5
Distorted perceptions	1	4.8
Problems with breathing	0	0.0
Other	1	4.8
I had no longer had time for the course sessions.	8	38.1
I had already quit using cannabis before the Quit Day.	3	14.3
I had already quit using tobacco before the Quit Day.	3	14.3
I did not want to quit using cannabis (any more).	2	9.5
I did not want to quit using tobacco (any more).	4	19.1
I did not want to *simultaneously* quit using tobacco and cannabis (any more).	5	23.8
I felt that the intervention did not help me.	7	33.3
Other reasons	10	47.6

Table 3. Seven-day abstinence rates at the end-of-treatment and 6-month follow-up assessments, N = 77.

Outcome	**n abstinent**	**n missing values**	**% of CCA sample**	**% of MAU sample**
End-of-treatment assessment				
Cannabis[a] abstinence (self-report)	18	16	29.5	23.4
Cigarette abstinence (self-report)	25	17	41.7	32.5
Dual-abstinence (self-report)	11	17	18.3	14.3
Dual-abstinence (cotinine-verified)	10	18	16.9	13.0
6-month follow-up assessment				
Cannabis[a] abstinence (self-report)	15	16	24.6	19.5
Cigarette abstinence (self-report)	8	18	13.6	10.4
Dual-abstinence (self-report)	6	17	10.0	7.8
Dual-abstinence (cotinine-verified)	4	19	6.9	5.2

[a] including co-administered tobacco; CCA sample = complete cases only; MAU sample = missings treated as users

Table 4. Means and standard deviations of repeatedly measured outcomes at baseline, the EOT assessment, and the 6-month follow-up assessment among complete cases.

Outcome	**n**	**Baseline**	**EOT**	**Follow-up**
	complete cases	Mean (SD)	Mean (SD)	Mean (SD)
Cannabis use frequency	54	2.99 (1.96)	1.14 (1.97)	1.60 (1.76)
Cigarette use frequency	54	16.23 (9.96)	5.49 (11.62)	10.76 (13.01)
CUDIT	39	18.41 (8.17)	--	11.33 (7.63)
FTND	38	3.76 (2.26)	1.13 (1.99)	1.92 (2.36)
AUDIT-C	40	5.20 (1.88)	4.82 (1.85)	4.70 (2.17)
BDI-V	40	34.43 (21.19)	25.00 (19.26)	23.72 (18.58)
BAI	40	11.92 (10.25)	7.85 (9.35)	5.84 (5.74)

Lower values represent better outcomes for all scales. AUDIT-C = Alcohol Use Disorder Identification Test, Consumption, scale ranges from 0 to 12; BAI = Beck Anxiety Inventory, scale ranges from 0 to 63; BDI-V = simplified Beck Depression Inventory, scale ranges from 0 to 100; CUDIT = Cannabis Use Disorder Identification Test, scale ranges from 0 to 40; EOT = end-of-treatment assessment; FTND = Fagerstrom Test for Nicotine Dependence, scale ranges from 0 to 10; EOT = end of treatment; SD = standard deviation

Table 5. Generalised estimating equation (GEE) models of the repeatedly measured outcomes over time.

Dependent variables	**Coefficient (*IRR/b*)**	***SE***	**95% *CI***	***p***
Cannabis use frequency [a]	0.699	0.073	(0.605; 0.807)	< .001
Cigarette use frequency [a]	0.819	0.059	(0.730; 0.919)	.001
CUDIT [b]	-3.590	0.548	(-4.663; -2.517)	< .001
FTND [a]	0.687	0.082	(0.585; 0.807)	< .001
AUDIT-C [b]	-0.347	0.117	(-0.577; -0.117)	.003
BDI-V [b]	-5.948	1.335	(-8.565; -3.332)	< .001
BAI [b]	-3.143	0.532	(-4.186; -2.101)	< .001

The predictor in every model is time; Time 1 = baseline, Time 2 = end-of-treatment assessment, Time 3 = 6-month follow-up assessment; CUDIT was measured only at Time 1 and Time 3; [a] models are based on a negative binomial model with a log link function; [b] models are based on a normal model with an identity link function; lower values represent better outcomes for all scales. AUDIT-C = Alcohol Use Disorder Identification Test - Consumption; BAI = Beck Anxiety Inventory; BDI-V = simplified Beck Depression Inventory; CI = confidence interval; CUDIT = Cannabis Use Disorder Identification Test; FTND = Fagerstrom Test for Nicotine Dependence; IRR = incident rate ratio, displayed for negative binomial models; SE = standard error

Table 6. Mann-Whitney *U* tests, applied to compare the use frequency change scores between participants who quit one substance and those who continued using both.

Comparisons	**n**	**Baseline** *M (SD)*	**EOT** *M (SD)*	**Follow-up** *M (SD)*	**Difference** *M (SD)*	***P*-value**
Cannabis use frequency of tobacco-only abstainers at EOT	14	3.2 (1.8)	1.0 (1.3)	--	-2.2 (1.7)	
Cannabis use frequency of co-smokers at EOT	35	2.9 (1.8)	1.6 (2.3)	--	-1.2 (2.5)	.188
Cannabis use frequency of tobacco-only abstainers at FU	2	5.5 (1.5)	--	4.1 (1.2)	-1.4 (0.3)	
Cannabis use frequency of co-smokers at FU	51	2.9 (1.8)	--	1.7 (1.7)	-1.2 (1.9)	--
Cigarette use frequency of cannabis-only abstainers at EOT	6	23.7 (19.1)	20.3 (28.2)	--	-3.5 (12.6)	
Cigarette use frequency of co-smokers at EOT	42	15.5 (8.0)	5.2 (6.9)	--	-10.2 (7.5)	.142
Cigarette use frequency of cannabis-only abstainers at FU	7	26.1 (15.6)	--	25.8 (24.1)	-0.4 (10.7)	
Cigarette use frequency of co-smokers at FU	46	15.4 (7.9)	--	10.3 (8.9)	-5.2 (6.9)	.259

EOT = end-of-treatment assessment; M = Mean; SD = standard deviation

FIGURE LEGEND

Figure 1. Participant flow